

1    We Claim:

2        1.     A method for identifying a nucleic acid with an electronic stringency device,

3        comprising the steps of:

4              forming a double-stranded hybridization product comprising a sample nucleic acid  
5        and a probe of known sequence, wherein the sequences of the sample nucleic acid and probe  
6        either are the same or differ by one nucleotide, an environmentally sensitive emissive  
7        fluorescent label being associated with the hybridization product in proximity to the nucleic  
8        acid to be identified, wherein either the sample nucleic acid or the probe is attached the  
9        electronic stringency device,

10             subjecting the double-stranded hybridization product to a varying electrophoretic  
11        force,

12             monitoring the fluorescence from the double-stranded hybridization product while  
13        varying the electrophoretic force over time, and

14             analyzing the fluorescent signal to identify the nucleic acid of the sample.

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16        2.     The method of claim 1, wherein the environmentally sensitive emissive label  
17        is selected from the group consisting of environmentally sensitive dyes, fluorophores and  
18        chromophores.

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20        3.     The method of claim 1, wherein the environmentally sensitive emissive dye is  
21        sensitive to hydrophilicity.

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23        4.     The method of claim 1, wherein the environmentally sensitive emissive dye is  
24        sensitive to hydrophobicity.

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26        5.     The method of claim 1, wherein the environmentally sensitive emissive dye is  
27        sensitive to pH.

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1       6.     The method of claim 1, wherein the environmentally sensitive emissive dye is  
2 sensitive to electrostatic charge.

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4       7.     The method of claim 1, wherein the environmentally sensitive emissive dye is  
5 sensitive to Van der Waals interactions.

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7       8.     The method of claim 1, wherein the environmentally sensitive emissive dye is  
8 sensitive to DNA sequence variability.

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10     9.     A method for analyzing a nucleic acid sequence, utilizing an electronic  
11 stringency control device, comprising the steps of:

12       providing the nucleic acid sequence, a probe of known sequence, and a label in  
13 proximity to the nucleic acid to be identified on the electronic stringency control device to  
14 form a labeled double-stranded hybridization product, the nucleic acid sequence having a net  
15 charge of a first sign, the label having a net charge of a sign opposite to the first sign,

16       subjecting the double-stranded hybridization product to an electrophoretic force,

17       monitoring the emission from the double-stranded hybridization product while  
18 varying the electrophoretic force over time, and

19       analyzing the emission to determine the sequence of the sample nucleic acid.

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21     10.    The method of claim 1, wherein the varying electrophoretic force is a pulsed  
22 sequence.

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